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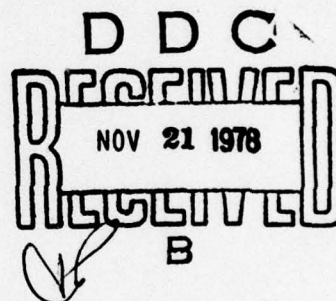


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NAVAL POSTGRADUATE SCHOOL
Monterey, California



THESIS

AN ANALYSIS OF THE NAVY MATERIAL
TRANSPORTATION OFFICE MANAGEMENT
INDICATOR REPORT AS A MANAGEMENT
INFORMATION SYSTEM PRODUCT

by

Gerald E. Mate

September 1978

Thesis Advisor:

J. M. Shiels

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An Analysis of the Navy Material Transportation Office
Management Indicator Report as a Management
Information System Product

by

Gerald E. Mate
Lieutenant Commander, United States Navy
B.F.A., University of Illinois, 1964

Submitted in partial fulfillment of the
requirements for the degree of

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NAVAL POSTGRADUATE SCHOOL
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ABSTRACT

The Navy Material Transportation Office (NAVMTO) was submitting a Management Indicator Report to Commander Naval Supply Systems Command (NAVSUP) as an element of a Management Information System (MIS). The Management Indicator Report is examined for the purpose of determining its effectiveness as a viable MIS product and is found to be lacking. An approach to develop an effective MIS for the NAVSUP/NAVMTO interface is provided. Emphasis is placed upon aligning the MIS with missions and functions assigned to NAVMTO. A proposed sample questionnaire is provided which could serve as a tool during the planning phase of the MIS development.

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I. INTRODUCTION

A. BACKGROUND

The importance of logistics is never more apparent than when the logistics system does not work and parts are not available when needed.

An essential part of the Navy's logistic system is the transportation system, which provides the means for moving material from a supply point to the ultimate user. The Navy's cargo transportation requirements are peculiar when compared with those of industry or the other military services. The ultimate users, the ships, are usually far from standard transportation routes, terminals or warehouses when the material is needed. A ship's material needs must be met either while it is on the line--at sea and many miles from any transportation terminal--or while it is temporarily in a port. In the latter case, material must be brought aboard from an operating base which itself requires extensive transportation services.

The originating and terminating points for the material are, in many cases, an ocean apart, although the Navy also makes extensive use of the continental United States (CONUS) transportation system. Material to be transported includes many types of commodities. Fresh produce, explosives, complex electronics gear, huge ship and airplane propellers, frozen food, armored tanks, engine parts, fuel, trucks and thousands of tons of bulk

cargo, such as sand, to name only a few of the thousands of commodities, must be transported and delivered to fleet units and operating bases both overseas and in CONUS.

As an indication of the magnitude of the Navy's transportation requirements and operations, in Fiscal Year 1977 approximately 1.3 million measurement tons of Navy material was carried by the Military Sealift Command (MSC) for delivery to overseas units [1]. During this same period, the Military Airlift Command (MAC) lifted over 50,000 short tons for delivery to overseas units.

To manage its logistical operations and meet its transportation requirements, the Navy has established an internal transportation organization. The Navy Material Transportation Office (NAVMTO) is an integral part of this organization.

NAVMTO is a field activity operating with a Commanding Officer under the command of the Commander, Naval Supply Systems Command (NAVSUP). The NAVMTO headquarters is located at the Norfolk Naval Operating Base in Norfolk, Virginia. Its mission is to perform transportation management functions of an operational and administrative nature as assigned and to administer the Navy Contract Cargo Airlift System (QUICKTRANS) [2:II-2; encl (1)].

As a subordinate of NAVSUP, it is necessary that NAVMTO provide Commander NAVSUP with information which indicates NAVMTO's degree of effectiveness in performing its mission.

In addition, both NAVSUP and NAVMTO require internal information systems to support managers in their roles as decision makers.

The NAVMTO Management Information System (MIS) in use at the time research was conducted for this study consisted primarily of a performance indicator report. The report was prepared monthly by NAVMTO managers in a NAVSUP prescribed format and forwarded to NAVSUP's Transportation Directorate (NAVSUP 05).

B. THESIS OBJECTIVE

The objective of this research was to analyze the NAVMTO MIS to determine if it is effectively supporting the management of the Navy's transportation efforts. Conclusions and recommendations for improving the current system or establishing a new one are also included.

C. ASSUMPTIONS AND SCOPE

An MIS is more than a channel to provide top management with information. The system should serve managers at all levels as a tool for making better decisions and controlling all aspects of their operations. Therefore, it is assumed that any MIS required by NAVSUP or NAVMTO should serve operational level managers, middle managers and strategic policy makers from the lowest operational level at NAVMTO to the Commander, NAVSUP.

With this in mind, the scope of this discussion will encompass those portions of the NAVMTO MIS which pertain

only to NAVMTO and NAVSUP. Further, since time and financial resources have been limited, this paper will focus primarily upon that portion of the MIS which deals with measures of effectiveness or performance indicators.

D. METHODOLOGY

Research for this thesis was conducted through review of pertinent literature in the fields of transportation, MIS and management organizations. In addition, extensive personnel interviews were conducted at NAVMTO headquarters and NAVSUP headquarters.

In conducting the interviews, the current performance indicator report was used as a vehicle to trace information flow and communications from the bottom of the two organizations to the top. Operating personnel were requested to demonstrate how they obtained data and what they did with them. Middle managers were requested to explain to the interviewer and, if necessary, demonstrate how they used the information they received in making decisions and controlling their portion of the operation. Additionally, these managers were asked how they processed the information in order to pass it up the line.

Top managers at both activities were asked how they received the information being sent up the line (format, frequency, etc.) and what they did with it.

All of the personnel interviewed, operators and managers, were requested to comment on the usefulness

of the present indicator report and on what improvements they felt could be made.

Finally, to gain first hand knowledge regarding the Navy's QUICKTRANS system, the writer flew a cross country QUICKTRANS route from Travis Air Force Base, California to Norfolk Naval Air Station, Virginia and back. Brief observations were made of warehouse operations at various terminals along the way.

II. THE NAVY'S TRANSPORTATION ORGANIZATION

Both external and internal environments and relationships have a significant effect on an organization's MIS. In performing its mission, NAVMTO deals extensively with Navy, Army and Air Force activities. Therefore, to more fully understand NAVMTO's role, it is necessary to examine the interface between the Department of Defense (DoD) and the Navy transportation systems.

A. THE DOD/NAVY TRANSPORTATION INTERFACE

The DoD transportation system consists primarily of three single manager Transportation Operating Agencies (TOA's). The Military Airlift Command (MAC), under the direction of the Secretary of the Air Force, is responsible for providing all common user air transportation space requirements. The Military Airlift Command (MAC), under the direction of the Secretary of the Air Force, is responsible for all common user land transportation requirements and for coordinating the inflow and outflow of materials through air and ocean terminals. The Military Sealift Command (MSC), under the direction of the Secretary of the Navy (SECNAV), is responsible for providing sea transportation to all DoD common users as requested. The three TOA's work under the provisions of the Military Standard Traffic and Movement Procedures, DoD Directive 4500.32-R (MILSTAMP) and various joint instructions which

provide additional guidance and specific directions to be followed.

The Navy Department, in addition to being the TOA for the MSC, is a common user of the services of all three of the TOA's in addition to managing its own transportation system. The SECNAV is ultimately responsible for the Navy's management of the system. Figure II-1 shows the broad organizational structure of the Navy's transportation system.

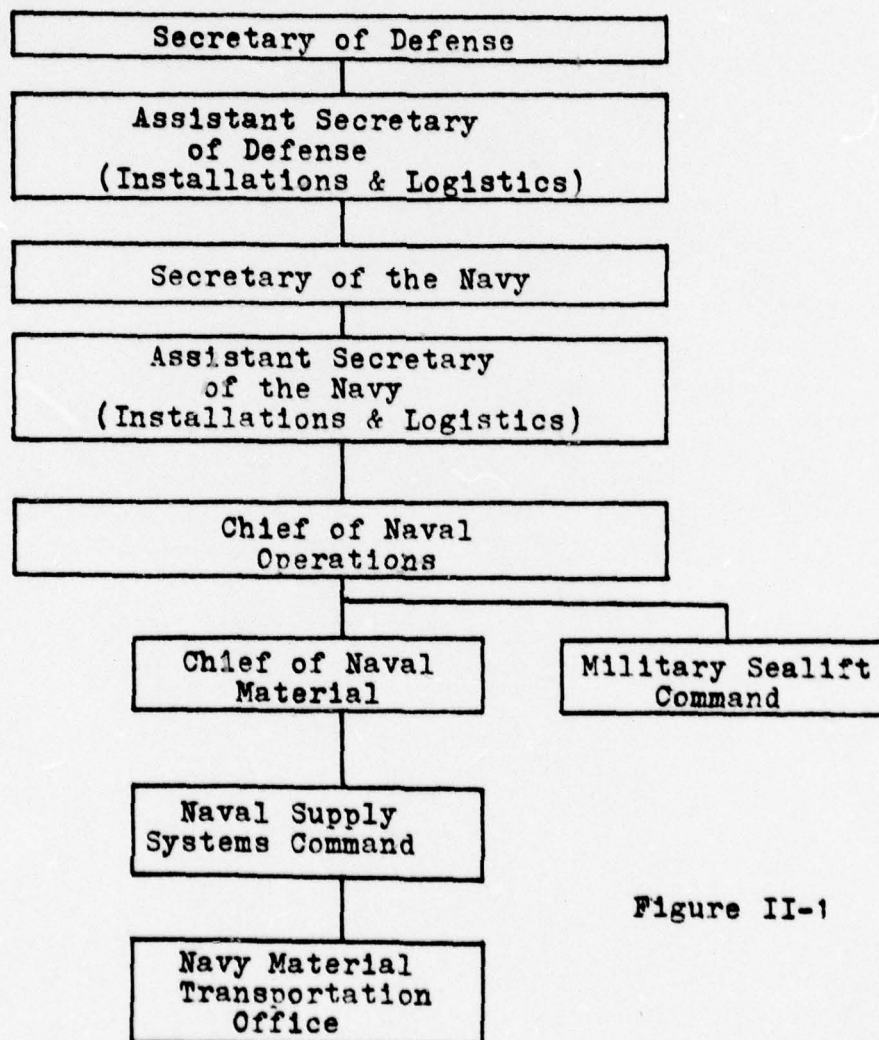


Figure II-1

B. THE NAVAL SUPPLY SYSTEMS COMMAND TRANSPORTATION ORGANIZATION AS OF SEPTEMBER 1978

The duties of Deputy Commander for Transportation (NAVSUP 05), Naval Supply Systems Command were:

Execute NAVSUP's responsibility for the development, management and control, worldwide, of transportation of Navy property, including personal property of military and civilian personnel; provide technical guidance to activities of the Navy regarding traffic management and transportation; provide management direction to the Navy Material Transportation Office; execute assigned responsibility for the Second Destination Transportation and Terminal Operations Financial Program; responsible for the effectiveness and efficiency of execution throughout NAVSUP of functions under the cognizance of SUP 05 [3:05-2].

Organizationally, the NAVSUP Transportation Directorate consisted of the Deputy Commander, Transportation and four divisions, Figure II-2.

DEPUTY COMMANDER, TRANSPORTATION (NAVSUP 05)

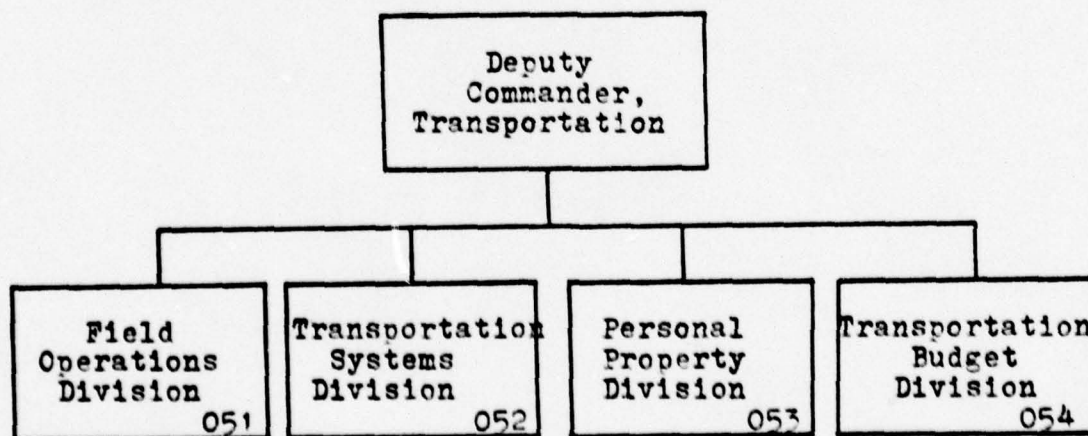


Figure II-2

The purpose of each of the NAVSUP 05 divisions was:

1. Field Operations Division (SUP 051). Administers Navy policies and procedures for the worldwide movement of Navy cargo (except personal property) via MAC, MSC and MTMC. Monitors timeliness of service provided by these single managers; serves as NAVSUP focal point for transportation when emergency type situations develop in overseas areas; promulgate and administer Navy operational container programs; and provide technical input to Navy and DoD study groups involved in development of long range military container programs [3:05-4].
2. Transportation Systems Division (SUP 052). Develop and maintain management information systems to appraise the responsiveness and efficiency of Navy transportation programs as well as provide cost data for budget formulation/execution; participate with DoD, Single Managers and other military groups in developing, maintaining and reviewing transportation programs [3:05-6].
3. Personal Property Division (SUP 053). Develop and recommend policy and regulations pertaining to shipment, storage and related services for personal property of Navy military and civilian personnel; monitor the effectiveness of the personal property movement program and initiate action to eliminate deficiencies and improve customer satisfaction [3:05-7].
4. Transportation Budget Division (SUP 054). Formulate, justify and execute the NAVSUPSYSCOM budget plan for Second Destination Transportation and Terminal Services (SDT) and recommend policy decisions on currently assigned Navy transportation budget responsibilities [3:05-9].

C. THE NAVMTO ORGANIZATION

As of September 1978, the NAVMTO, located in Norfolk, Virginia, with organizational elements in Oakland, California, and Bayonne, New Jersey, was an operating field activity of NAVSUP. It performed transportation management and administration functions requiring day to day interface with shipping activities and area commands of the TOA's [4:12]. NAVMTO employed about 140 civilians and eight

military personnel. The organization was divided into five departments as shown in Figure II-3.

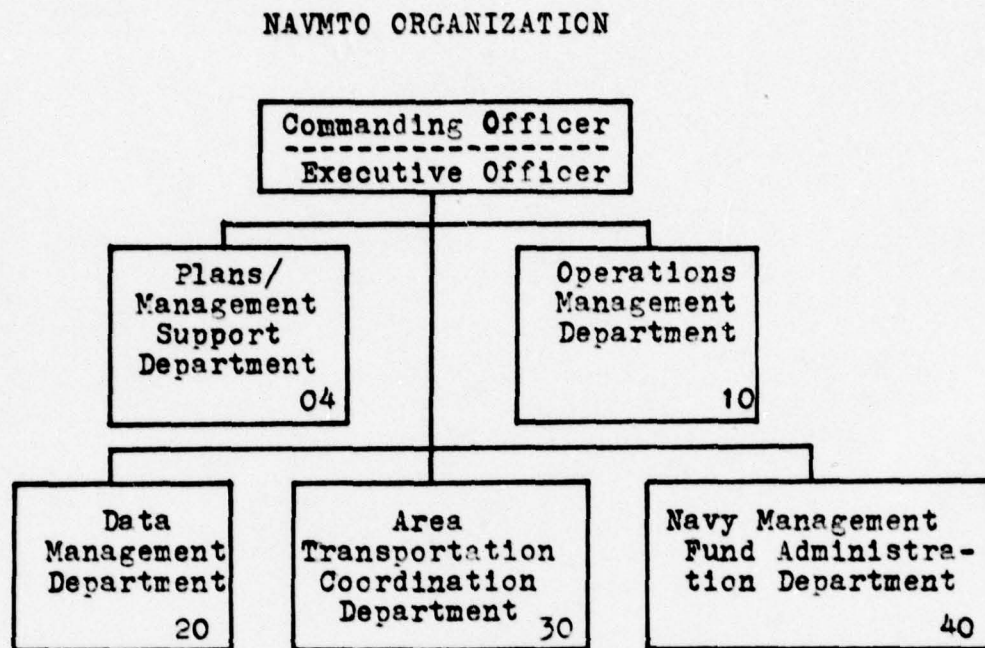


Figure II-3

At the time this research was being conducted, a NAVMTO proposed reorganization was under study. If approved by NAVSUP, the organization will appear as shown in Figure II-4. It was assumed by NAVSUP 052 that information reporting requirements and responsibilities would remain the same under the new organization [10].

The NAVMTO Organization Manual delineated the purpose of each of the five departments as follows:

1. Plans/Management Support Department (04). Provide coordinated management effort in the accomplishment of the mission through the development, implementation and maintenance of Command programs and plans. Provide

NAVMTO PROPOSED REORGANIZATION

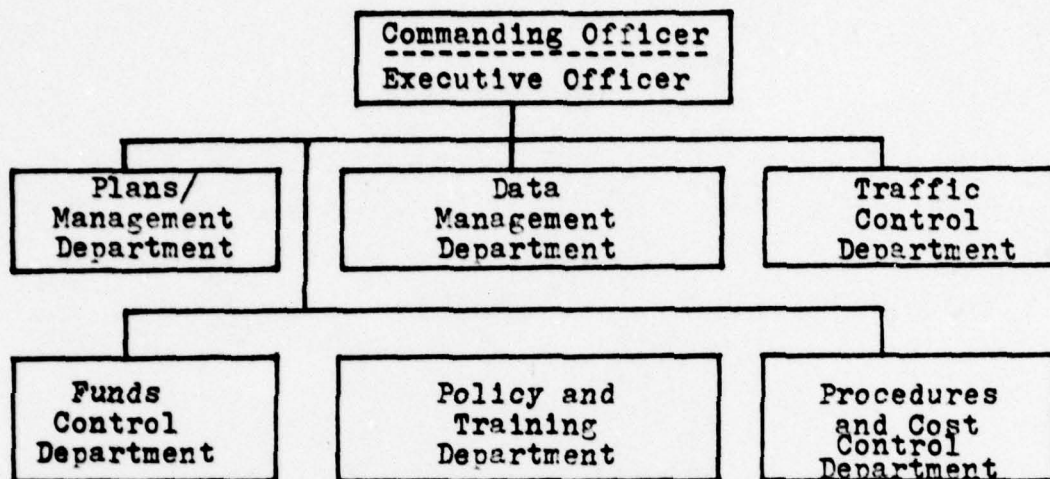


Figure II-4

common administrative support services. Provide a military team to operate the Mobile Navy Overseas Air Cargo Terminal Unit as contingency situations require [2:II-6].

2. Operations Management Department (10). Ensures the orderly flow of Navy sponsored material through air and water ports as the Navy Shipper Service Representative with the Single Managers for transportation. Provides Navy management for the QUICKTRANS Airlift System and arranges for and coordinates SAAM (Special Assignment Airlift Mission) flights. Prepares the initial QUICKTRANS system design. Develops and conducts training programs on a worldwide basis in the application of transportation/traffic management techniques to provide technical assistance and staffing criteria for the use of appropriate resource managers. Directs and schedules field assistance teams to Navy shipping activities [2:II-12].

3. Data Management Department (20). Under the direction of NAVSUP, execute the NAVSUPSYSCOM SDT [Naval Supply Systems Command Second Destination Transportation] budget plan for transportation of things and terminal services. Perform liaison functions as specifically approved by NAVSUP to NMF [Navy Management Fund] participating commands, bureaus, and offices. Perform as the Navy

Central control for furnishing Navy-wide transportation accounting and management information as directed on a recurring and non-recurring basis [2:II-20].

4. Area Transportation Coordination Department (30).

Provide control of the expenditure of Navy transportation funds to effect reduced transportation costs at all Navy shipping activities or other agencies or activities shipping Navy material through intensified traffic and transportation management [2:II-23].

5. Navy Management Fund Administration Department (40).

Administer and account for the Transportation of Things [TOT], Navy subhead of the Navy Management Fund including liaison with the Military Airlift Command, the Military Sealift Command, the Military Traffic Management Command, CNO [Chief of Naval Operations], NAVCOMPT [Navy Comptroller], all other Navy claimants and other government agencies. Establish, review, support and/or maintain financial control of all aspects of the Management Fund [2:II-27].

III. THE NAVMTO MANAGEMENT INDICATOR REPORT

The NAVMTO information reporting system was initiated in February 1977. As a result of conversations between NAVMTO's Executive Officer and representatives from NAVSUP, code 052, a set of management indicators and a reporting format were established [5]. A copy of the report format appears as Exhibit 1. The NAVSUP letter which directed the submission of the report did not specify submission dates for the report. Based on informal submission of earlier indicators, NAVMTO Management assumed that the report was a monthly requirement. Later, in March 1978, a due date was informally established during telephone conversations between NAVMTO, code 04B and NAVSUP, code 052C, as the 20th of each month [6]. Enclosure (1) to the NAVSUP letter described the indicators in terms of scope, measurement and performance parameters. As can be seen in Exhibit 1, the report was divided into three main sections.

- A. Transportation Systems Management Indicators, which were to describe the position of the Navy in the transportation environment relative to the other services.
- B. NAVMTO Performance Indicators, which were to examine the operating responsibilities of NAVMTO.
- C. NAVMTO Productivity Indicators, which were to be used in analyzing the efficiency of direct NAVMTO efforts [7].

Interviews with NAVMTO department heads during the period 3 through 6 April 1978, indicated the report and parameters were formulated by NAVSUP, code 052C, who was a

NAVATO MANAGEMENT INDICATOR REPORT

Reporting Period _____
Submission Date _____

ITEM	DESCRIPTION	INDICATOR(S)	STATUS*
A.	SYSTEM	X X X X X	X X X
1.a.	Container Cargo Percentage System	EA	X X X
b.	Container Cargo Percentage Navy	WA	X X X
2.a.	Container Utilization - System	EA	X X X
b.	Container Utilization - Navy	WA	X X X
3.a.	TP-4 Utilization - System	EA	X X X
b.	TP-4 Utilization - Navy	WA	X X X
4.a.	MAC ATCND Hit Rate - System	EA	X X X
b.	MAC ATCND Hit Rate - Navy	WA	X X X
5.a.	Diversions-Challenge Ratio	EA	X X X
b.	Diversions-Challenge Net Benefit	WA	X X X
6.a.	Load-Less Load Ratio-System	EA	X X X
b.	Load-Less Load Ratio-Navy	WA	X X X
7.	GBL Receipt Rate	EA	X X X

ITEM	DESCRIPTION	INDICATOR(S)	STATUS*
C.	NAVATO PRODUCTIVITY	X X X X X	X X X
1.	GBL Processing	EA	X X X
2.	Air Clearance Processing	WA	X X X
3.	Fleet Location Inquiries	EA	X X X
4.	QUICKTRANS Management	WA	X X X
5.	Transportation Management	EA	X X X

*STATUS: G - Green
Y - Yellow
R - Red

EXHIBIT 1

former NAVMTO employee. None of the department heads were of the opinion that NAVMTO had much, if anything, to say about what performance indicators were incorporated into the report.

An August 1977 NAVSUP letter modified the requirements of the report because, "Frequent evaluation by the SUP 05 and NAVMTO staffs have identified several areas of the program which require clarification or modification [8:1]." However, conversations with NAVMTO's MIS coordinator indicated that NAVMTO, again, had little input to the contents of the report modifications [6]. NAVMTO's reply to the modified requirements was that it could not completely comply in reporting the modifications as requested [8:1,2].

The modifications per the 18 August 1977 letter are not shown on Exhibit 1, but are included in the descriptions of the Indicator Report which appears as Appendix A.

Responsible NAVMTO codes were requested to forward their indicators to the Special Assistant for Management Analysis, code 04B, who coordinated and consolidated the report for submission to NAVSUP under a covering letter signed by, or at the direction of, the Commanding Officer.

A. USE OF THE INDICATOR REPORT AT NAVMTO

Interviews were conducted with four of the five NAVMTO department heads during the period 3 through 6 April 1978 (the fifth department head was unavailable due to personal

problems). In addition, deputy department heads, staff members and first line supervisors were queried about their involvement with the Indicator Report and the extent to which they made use of it. Responses were universally negative toward the report. None interviewed used the report as a management aid and none felt it adequately or effectively provided an accurate picture of NAVMTO's operation. None interviewed knew how the performance standards were formulated. Department heads felt that NAVMTO should have had more of an input as to the kind of indicators that were to be reported and how they were to be formulated.

The Indicator Report was not used by NAVMTO's Commanding Officer or Executive Officer. The Executive Officer knew what the report was, but didn't know what was in it. The Commanding Officer had his own set of management information charts that were maintained by his secretary and displayed in a conference room. Some of the charts contained the same information that was presented in the Indicator Report, but there were also charts and graphs displaying data not available in the report. These were primarily financially oriented. Many of the indicators contained in the Indicator Report were not displayed in the conference room.

The Commanding Officer and department heads could not recall ever having had a meeting to discuss the report or its contents as submitted to NAVSUP. There was a complete

lack of interest in using the report as any kind, or any part of, an MIS.

B. USE OF THE INDICATOR REPORT AT NAVSUP

The NAVMTO Management Indicator Report was received by mail at NAVSUPSYSCOM. Following normal administrative procedures, the report was first seen by NAVSUP 05, who initialed it and noted any comments or questions on the document. The report was then sent to NAVSUP 052, Transportation Systems Division, where it was further routed to the desk of the manager who had cognizance over this particular function, NAVSUP 052C.

At this desk, the report was examined for what appeared to be deviations from past reports or performance parameters. Code 052C did not know how the original performance parameters were established, but he was beginning to revise some of them based upon data contained in the reports he had been receiving since he had taken this position (a period of about 6 months).

NAVSUP 052C posted some of the data to graphs he maintained in a notebook. If significant deviations were noted, he telephoned NAVMTO and attempted to get an explanation from either the Management Analyst, Code 04B, or from the department head responsible for providing the questionable data. On one occasion a letter was sent from NAVSUP to the Commanding Officer, NAVMTO, requesting further evaluation and explanation of seven of the reported

indicators [15]. The letter further requested, "...a more comprehensive evaluation of the monthly management indicator report with each submission." NAVMTO responded by stating that the report was being used as a management tool and that future reports would contain comprehensive evaluations of significant trends [9]. There was, however, no noticeable change in reports submitted subsequent to this letter.

The report was filed by Code 052C and unless Code 05 or any other division requested specific information contained in the report, no further use was made of it.

Information contained in the report was also received in other formats by other divisions within NAVSUP. For example, NAVMTO daily telephoned a Cargo On Hand report, to NAVSUP 051, which gave specific cargo backlogs at various air-route channel terminals. The same report also provided the number of short tons lifted for the preceding 24 hour period. The other NAVSUP divisions, consequently, had no use for the Management Indicator Report received by NAVSUP. They had their own methods of obtaining any information they felt they required.

The Deputy Commander, Transportation, was not regularly briefed by Code 052 concerning the Management Indicator Report. When a specific piece of information was desired, NAVSUP 05 would usually request the information from the division having cognizance of the functional area in which he was interested.

C. REPORT FAILURE

The Management Indicator Report failed as an MIS product because it was designed and implemented poorly. There was no consideration given to the informational needs of the operational levels at NAVMTO. Department head MIS requirements were solicited in the case of at least one of the department heads, but his response was ignored.

Planning did not include analysis of the information flow and possible sources of raw data. NAVMTO personnel were given a raw data requirement and it was left to their discretion as to how the information would be obtained. Possible man/computer interfaces were not explored by utilizing the Systems Analysts available at NAVMTO [16]. Consequently, the informational worth of the indicators was questionable.

In assessing the informational worth of an indicator during the interview, two factors, validity and accuracy, were considered by this writer. An indicator was considered valid if the data used to compute the indicator was quantitatively correct. The following examples of invalid and inaccurate indicators were discovered during interviews.

Air clearance challenge process times reported did not consider any time consumed between receipt of NAVMTO's reply at NSCNORVA and actual transmission of the reply to MAC headquarters via AUTODIN. Also, since it was assumed by NAVMTO that all clearance requests received by telephone were processed within eight hours, they were not counted at all. Since the majority of clearance requests were received by telephone, the indicator understated NAVMTO's performance in responding to clearance requests.

The request to MAC headquarters for a monthly report of port hold times did not define the measurement. Also, MAC's monthly report contained a statement--as reported in Appendix A, paragraph C9 of this paper--that the data being sent should not be considered as valid for the purpose of comparing Navy versus System effectiveness. Consequently, the validity and accuracy of this indicator were doubtful.

Data sent to NAVMTO by MSC on the MSC-6 Report was outdated and inconsistent. Figures shown as actually lifted for specified months fluctuated significantly for as much as two years. Table I illustrates this phenomenon for fiscal year 1977. Cases of negative amounts lifted were observed, this obviously being done to correct for too high a figure being reported some time in the past. This situation affected the variance in forecasting indicator for MSC and since forecasting was done by analyzing historical data, NAVMTO's MSC forecasted requirements were based on inaccurate data.

Man hours devoted to air clearance processing, fleet location inquiries and QUICKTRANS management were subjective estimates rather than factual data. As such, they were considered invalid and inaccurate.

NAVMTO management did not see how the report contributed to the successful accomplishment of NAVSUP's or NAVMTO's objectives and saw no management value in the report. Resenting having to put themselves on report by reporting on their performance and receiving no benefit from the report, department heads could not use the report as an element of an MIS. Forcing NAVMTO to continually submit the report did not correct this situation and, in fact, increased resistance to its use. NAVMTO personnel simply could not effectively use the report in the form that NAVSUP required.

Use of the report at NAVSUP indicated it was nothing more than a data sheet--handy to have in case someone just happened to need a particular piece of information. It was

LIPT AMOUNTS REPORTED
ON MSC-6 REPORTS FOR
FISCAL YEAR 1977
(measurement tons)

	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
OCTOBER	90,110											
NOVEMBER	106,252	113,626										
DECEMBER	105,742	101,919	115,696									
JANUARY	105,596	104,841	99,615	93,734								
FEBRUARY	107,128	104,082	95,117	83,963	93,031							
MARCH	109,752	104,150	94,850	87,150	84,013	108,300						
APRIL	109,820	104,184	94,999	89,864	77,211	107,398	113,580					
MAY	109,238	104,706	97,054	90,580	76,624	108,697	99,821	151,637				
JUNE	109,942	106,022	97,597	90,777	76,404	109,080	101,900	122,664	128,288			
JULY	110,161	105,913	98,078	91,576	76,598	109,189	103,706	125,606	117,332	117,121		
AUGUST	109,275	105,914	98,500	90,841	76,906	110,048	101,897	125,890	122,184	128,551	138,040	
SEPTEMBER	109,431	106,053	98,408	90,660	76,863	109,560	102,757	126,311	121,731	128,400	108,302	129,036

Table I

not part of a planned, organized information flow to top management. Interviews with NAVSUP 05 disclosed that he had not been consulted during the formulation of the report to determine what he required to perform his job.

Consequently, it appeared that in order to provide a useful, workable NAVSUP/NAVMTO MIS, the Management Indicator Report should be completely redesigned.

IV. AN APPROACH TO CREATING AN NAVMTO MIS

A. THE NEED FOR AN MIS

The magnitude and importance of Navy logistics requires that there exist a well coordinated, efficiently run transportation organization. Such an organization must depend upon a system of communications and management/operations interface which provides information necessary to support rational decision making.

An MIS, when properly designed and implemented, assists operational levels in effectively using existing facilities and resources in performing their functions; assists middle management in tactical planning and controlling resources; and provides top management with information required to formulate objectives, define goals and provide direction to the entire organization [17:206].

NAVMTO's current information system, in the form of an Indicator Report, came into existence in February 1977. As explained earlier in this paper, NAVMTO personnel did not use the Indicator Report as a management aid and the indicators as reported were not always valid and/or accurate.

The report did not assist operational levels in effectively using their facilities and resources and did not assist NAVMTO middle and top management levels in tactical planning and resource controlling. NAVSUP did not use the report as a management tool for strategically

directing the transportation organizations operating under its command. Consequently, at the time this research was conducted, the NAVMTO Management Indicator Report was not a well designed and implemented MIS product.

The remainder of this paper will be devoted to a proposed approach for creating a useful MIS for the NAVSUP/NAVMTO organizational interface.

B. FUNCTIONAL MEASUREMENT

In order to accomplish its mission, NAVMTO was directed by NAVSUP to perform various functions [2:II-2; encl 1]. These functional statements specifically stated what actions NAVMTO was to take in order to accomplish its assigned objectives (missions). The functional statements provided more than simple guidelines. The functions are listed in Appendix B.

The functions were incorporated into NAVMTO's Organization Manual and each function was assigned to one or more of the five departments.

Through the Organization Manual, the Commanding Officer delegated additional functions to each department. This was necessary to provide for smooth work flow and to affix specific responsibility for carrying out the NAVSUP assigned functions. Administrative and staff service functions were also assigned to departments; these functions supplemented and supported the NAVSUP assigned functions. Together, the combination of NAVSUP assigned functions and

supplemental organizational functions provided a base for NAVMTO's efforts in accomplishing its assigned missions.

If the NAVSUP assigned functions were interpreted by NAVMTO managers as NAVSUP meant them to be and if the relative priorities of the functions were perceived the same by NAVSUP and NAVMTO management, the NAVMTO efforts to meet mission objectives would be aligned with NAVSUP desires. A strong interlocking base of functions would exist to support NAVMTO's missions. Figure IV-1 illustrates this relationship.

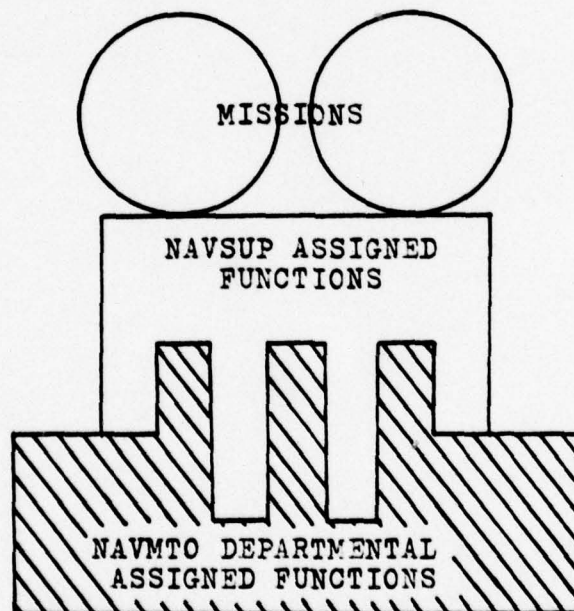


Figure IV-1

On the other hand, unstable support would result if NAVMTO's managers perceived their functions differently from what NAVSUP had intended, or if the functional

priorities of NAVMTO and NAVSUP were not the same. Figures IV-2 and IV-3 illustrate this graphically. The most unstable support of assigned missions would result if both priorities and functional perceptions differed between NAVMTO and NAVSUP management, Figure IV-4. Each organization would lose sight of the overall missions and would devote immoderate effort to get the other in line with its own perceptions and interpretations.

The situation as shown in Figure IV-4 may have existed at NAVMTO. During interviews there was an attitude on the part of NAVMTO department heads that NAVSUP's required MIS did not adequately provide a picture of NAVMTO's operation. NAVSUP, on the other hand, wasn't sure that what was being reported was what should be reported. This was evidenced by the fact that both NAVSUP 05 and the Commanding Officer, NAVMTO, had requested a study be undertaken to determine if what was being reported was what they should see as part of a valid MIS [18].

Part of the problem of implementing a valid MIS at NAVMTO is to determine which functions are performed, which require management attention and the degree of importance to be attached to each. This would be the first step in assuring NAVMTO and NAVSUP functional perceptions are identical.

The following sections describe a method for determining what functions are being performed, how critical they are

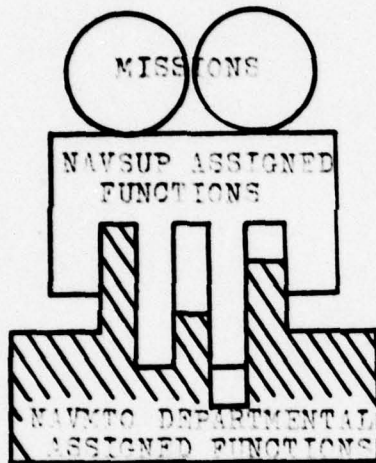


Figure IV-2

Different perception of priorities

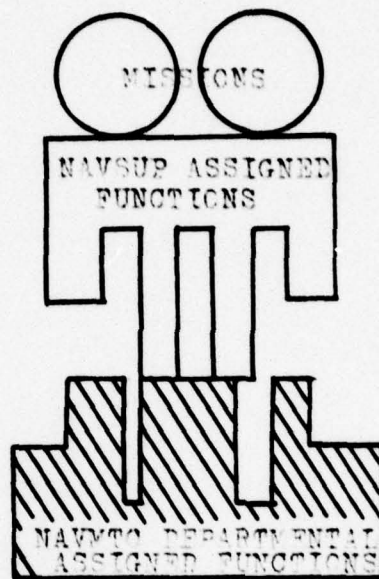


Figure IV-3

Different perception of assigned functions

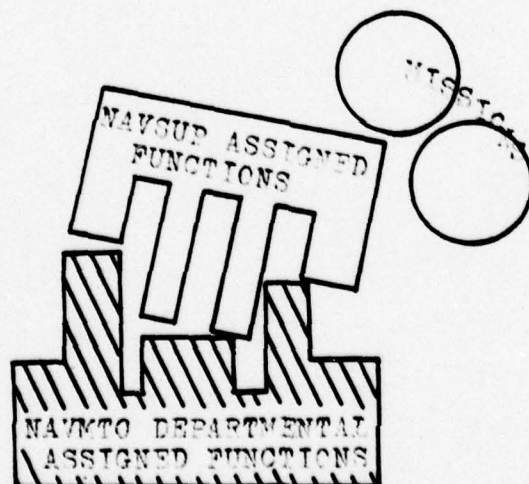


Figure IV-4

Different perceptions of priorities and assigned functions

considered to be and what measures can be used to determine whether or not the functions contribute effectively to NAVMTO's missions.

C. FUNCTIONS AND INFORMATION REQUIREMENTS DETERMINATION

NAVMTO department heads were not in a position to determine general mission requirements for the Navy's transportation system or even for NAVMTO. However, their contribution to a complete analysis of NAVMTO functions would be highly desirable, if not essential. All of the department heads were career civil service employees who had extensive backgrounds in transportation or accounting. All were intimately familiar with Department of Defense transportation procedures and, in particular, with their department's interface with the Navy's transportation system. Consequently, the first step in remodeling the NAVMTO MIS would be to have the department heads identify what they perceived their department's functions to be in relation to NAVMTO's missions. The method used to do this could be similar to the one used in a study conducted in 1972 to determine performance indicators for United States Air Force base level transportation functions [19].

A questionnaire would be given to each NAVMTO department head. Instructions for filling out the questionnaire would emphasize that the answers to be provided were to be what the department heads perceived or what their opinions were, that the answers should not be regurgitations of promulgated

instructions or book theory, and further, that emphasis should also be placed on the fact that the input the department heads provided would be used in designing a new MIS.

The first answer section of the questionnaire would request each department head to state what he or she felt were NAVMTO's and the department's missions. The next section would request that the functions relating to each of the listed missions be identified. Each of the functions would be labeled as to its importance in meeting the missions. To simplify the labeling and rating of the functions, a simple ordinal rating scale would be included as a part of each question.

Next, each department head would be asked to identify what he or she perceived to be valid performance indicators for each of the missions listed.

Finally, each department head would be given the opportunity to identify any other information needed to effectively manage the department and to list any comments and/or suggestions.

Appendix C is a sample of a questionnaire that would meet the requirements outlined above. It is estimated this questionnaire would take no more than two hours for each department head to complete.

D. QUESTIONNAIRE UTILIZATION

1. The NAVMTO Team

NAVMTO's Organization Manual states that one of the purposes of the Special Assistant for Management Analysis is to, "Gather, analyze and present timely and significant management analysis." Further, it lists one of the functions of this position as, "Develop and maintain Management Information Systems...[2:II-7]." Therefore, the Special Assistant would be assigned the task of distributing, assisting in filling out, and collecting the completed questionnaires from the NAVMTO department heads. In addition, the Special Assistant would serve as the NAVMTO Team Leader of a proposed NAVSUP/NAVMTO MIS Design and Implementation Committee. This committee would consist of the combined NAVSUP and NAVMTO teams. Its tasks will be discussed later in this paper.

The proposed NAVMTO Team would consist of the Commanding Officer, NAVMTO, the Team Leader, a computer systems analyst and the five department heads. The computer systems analyst would be a key participant to ensure the integration of new management information system data into the existing information systems. He would also be of value in determining which portions of the new system were currently machine compatible, which portions could be made machine compatible and which would be unlikely candidates for mechanization.

The Special Assistant would inform the Commanding Officer, NAVMTO, of the team's intent to meet, provide him a copy of the questionnaires and request his comments. The Commanding Officer would provide the Assistant with any management information he desired to be included in the MIS.

2. The NAVSUP Team

Two of the functions of the Transportation Systems Division of NAVSUP are: (1) to "Manage the development, implementation and maintenance of transportation data systems," and (2) to "Design and develop management information systems for use in appraising various transportation programs [3:05-6]." Therefore, NAVSUP would be represented on the NAVSUP/NAVMTO MIS Design and Implementation Committee by the Transportation Systems Division Head (Code 052)--who would serve as the Committee Chairman--and by the project manager responsible for the NAVMTO MIS project, Code 052C.

Code 052 would consolidate the other three NAVSUP Transportation Divisions' NAVMTO information requirements. A questionnaire similar to the one used at NAVMTO might be obtained from each division, but would be oriented toward the final section--the information required from NAVMTO to manage each division. Or another approach might be for Code 052 to personally contact each of the other division heads and request they inform him of their information requirements.

Heavy emphasis should be placed upon determining what management information the Deputy Director, NAVSUP 05, desired. This could be accomplished through personal contact and by reviewing previous requirements of the Director, such as information required to brief the Commander, Naval Supply Systems Command.

3. The NAVSUP/NAVMTO MIS Committee

A committee approach would be used for two reasons: first, to take advantage of the expertise of some of the most experienced transportation management personnel in the Navy and, second, to help overcome a natural resistance to a new system. This resistance would be strong since any new system may be thought of as a "report card" (as in the case of the Indicator Report), possibly putting its users on report and making them look ineffective in their jobs:

It is generally agreed that participation and communication are the ways to overcome resistance. Employees will tend to accept systems they have helped to design because they see the need for the design features [17:426].

The Committee would first review the missions and functions as submitted in the NAVMTO questionnaires to ensure conformance with NAVSUP directed functions. Those functions identified in the questionnaires as having no counterparts in the NAVSUP assigned functions, along with performance indicators which were related to them, would be separated from the others.

Next, the Committee would review and analyze all performance indicators as submitted in the questionnaires. Determinations would be made as to which indicators were feasible to compute without additional data collection effort, which were feasible to compute with additional effort, and which were infeasible to compute due to the impossibility of obtaining the raw data necessary for computation. The latter indicators would be completely eliminated from consideration and the former two would be evaluated on a cost/benefit basis.

In many cases, a quantitative benefit analysis would be impossible. However, qualitative guidelines could be developed. Guidelines such as being very selective in transmitting only that information which the prospective user needs to perform his job [21:81]. Two other guidelines were suggested by Rudolph Hirsch when he stated that information must influence decisions and that politically produced information has no dollar value [20:35,37]. The former implies that information has no value if it does not influence management decisions or functional operations of the organization. The latter implies that it is not worthwhile to produce information for a person who hasn't the influence to do something with it. Additional qualitative and quantitative guidelines could be used to determine the benefits of obtaining data and to assist in computing the requested information and indicators to be included in a report. Indicators and information whose estimated

costs exceeded benefits would be eliminated. (Care would be taken to include all benefits accruing from each piece of information to ensure a cost-beneficial piece of information was not discarded. For example, a piece of information costing \$10 might be used in computing each of three separate indicators, the benefits being \$7, \$5 and \$3, respectively. Alone, none of the indicators would be cost effective, but, in the aggregate, \$15 worth of benefits would be obtained at a cost of \$10.)

The remaining indicators and information would be associated with the functions to which they pertained. Utilizing the data provided in the questionnaires, the functions would be listed in criticality-to-mission order. This list would: (1) provide an order in which information-providing programs should be initiated, and (2) provide guidelines for deciding which programs should be retained in cases of resource constraints.

Finally, the Committee would determine and set performance standards. Standards would not be set for those indicators for which no statistical or historical data existed. Instead, time frames would be established and procedures outlined so that the data might be collected and standards established at a future date.

4. The Report Integration

When the Committee finished the review, all remaining indicators and informational data (including those identified as unique to NAVSUP assigned functions)

would be incorporated into a report format, and programs would be developed to provide the data required for performance indicator computations and such other information as might be requested by the managers. These remaining indicators and information would be representative of what the system could feasibly provide, would be related to specific NAVMTO functions as determined by the department heads or NAVSUP, and would be beneficial from a utilization-of-resources point of view.

NAVSUP would then decide which indicators and what information provided by the report it required in performing its role and meeting its objectives. It is envisioned by this writer that the information required by NAVSUP would be less in quantity and detail than that required by NAVMTO management. Higher levels of management generally need less detailed information and tend to have need for compressed, summarized and filtered data [17:43; Fig. 2-6]. Figure IV-5 charts the flow of the Committee's work and outputs.

NAVSUP would determine the format and time frames for production of the report. The result of this determination would be an official directive specifying the requirement for the report, the format of the report, the specific information required and the frequency of submission.

NAVMTO, using an internal directive, would assign reporting responsibilities and specify desired format, time of submission and to whom the report would be submitted.

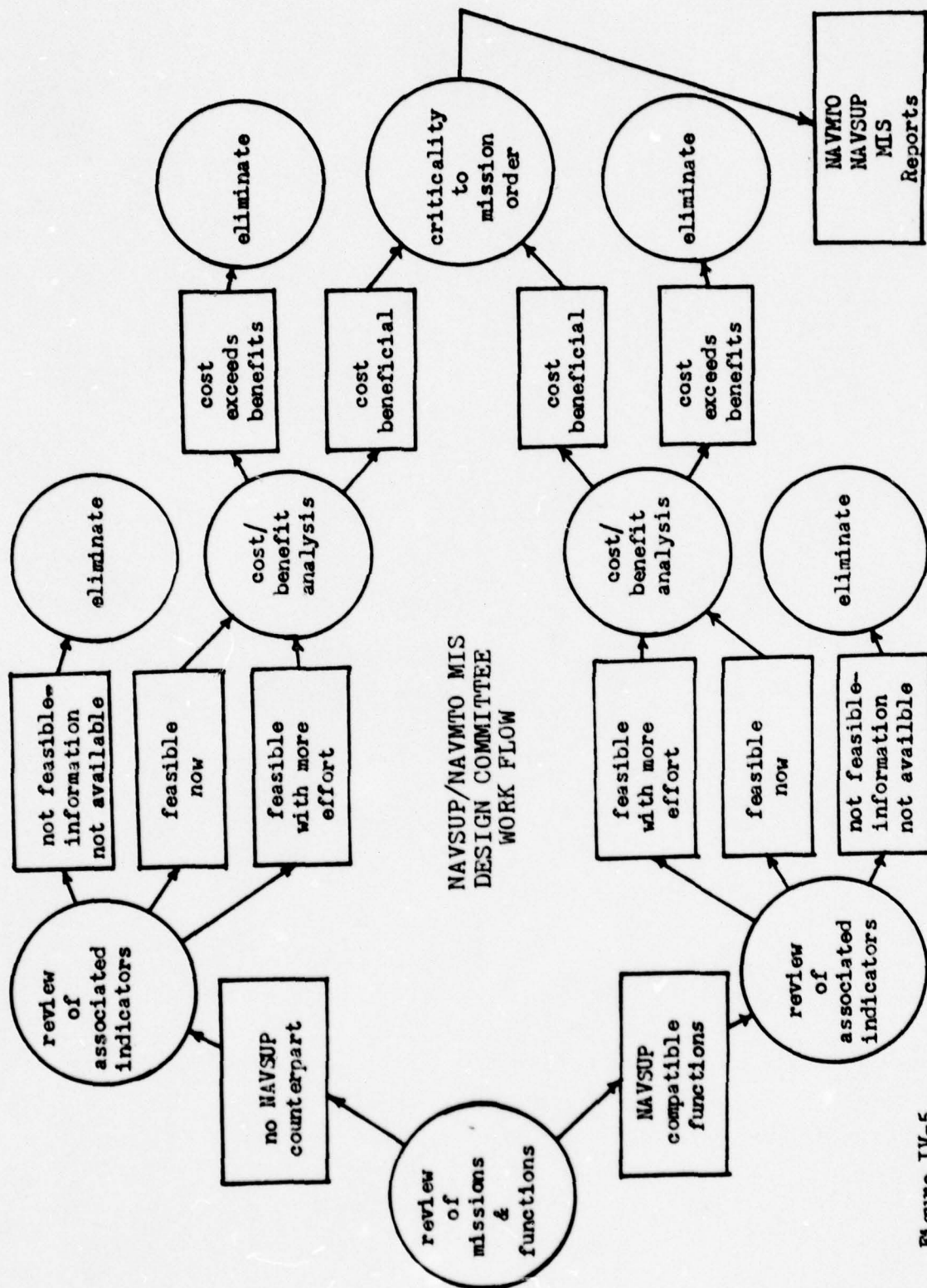


Figure IV-5

V. SUMMARY AND CONCLUSIONS

The NAVMTO is an important element in the Navy's transportation network. As such, it requires an MIS that will provide its operators and managers with information to assist them in performing their tasks and making decisions. The MIS should also provide top management with a reliable assessment of NAVMTO's operating efficiency in meeting its operational objectives, as stated in Ref. 17:

A management information system is more than a set of ideas or concepts; it is an operational system performing a variety of functions to produce outputs which are useful to operations personnel and management of an organization [17:189].

In February 1977, an information system was implemented at NAVMTO by direction of NAVSUP. The system was primarily designed by a former manager at NAVMTO who worked for NAVSUP's Transportation Directorate. The system originally consisted of seven Transportation Management System indicators, twelve NAVMTO Performance Management indicators and five NAVMTO Productivity Management indicators. Later, amendments to the report requirement changed the number of indicators to nine, eleven and five, respectively.

During the time that research was being conducted, personnel at NAVMTO did not feel the Indicator Report was a valid or accurate management tool. Department heads were of the opinion that they should have been consulted in the design of the report. NAVMTO personnel did not

perceive the report's performance standards to be true measures of performance, and examples of inaccurate and invalid indicators were discovered in past reports.

The report was not used by the Commanding Officer or Executive Officer, apparently because both officers decided that there were better ways to evaluate and control the organization.

The closest NAVMTO came to using an MIS was the morning department head meeting (which was not attended by the MIS coordinator). During these meetings, there were no scheduled reports concerning the indicators on the NAVMTO Management Indicator Report.

The report, therefore, was an ineffective element of the MIS. It didn't satisfy the needs of any level within the NAVMTO organization.

Other than as an occasional data reference, the Indicator Report was not used as a management aid at NAVSUP. The report, essentially, was processed through normal mail routing procedures, noted and filed. Data appearing on the report were redundant since most divisions within NAVSUP 05 had their own sources of information at NAVMTO.

As at NAVMTO, the report was not used by the front office, the Deputy Director for Transportation, at NAVSUP. Neither meetings nor briefings were held with Code 052 to specifically discuss the indicators themselves or the report as a whole.

Any new system should take into consideration the perceptions of assigned missions and functions held by personnel at operational levels within the organization. If operational level perceptions differ from those held by middle and top management, there will be non-congruency in efforts taken to meet the organization's objectives. Instead of strong, interlocking efforts to support objectives, mis-aligned efforts will decrease the probability of mission obtainment.

One approach to ensure that top management and operational level managers are similarly goal oriented is to plan an MIS from the top of the organization down. In this approach, the functions within the boundaries of a system are first defined and identified [21:158]. They are then further broken down into sub-functions and finally into information requirements to support the functions.

Once NAVMTO functions are defined, it must be determined if operational level managers' perceptions of missions and functions coincide with those of middle and top management. The next step would be to determine what information the operational level managers needed to efficiently run their parts of the organization. To accomplish this, a questionnaire has been proposed which would be used to identify mission and functions perceptions and to determine how much emphasis operational level managers place upon each function. The questionnaire would also be used to identify which performance indicators should be used to

evaluate an organization's performance in achieving its goals. Such a questionnaire appears in Appendix C.

After administration of the questionnaires, a critical evaluation of the recommendations, requirements and answers submitted by the department heads would be undertaken by a NAVSUP/NAVMT0 MIS Committee. The department heads would be included as members of the committee. Cost benefit analyses of recommended performance indicators would be conducted to eliminate those indicators which were not economically beneficial. NAVMT0 function priorities would also be established by the Committee.

Upon completion of the evaluation, the Committee would determine what information should be included in a NAVMT0 oriented report and what should be provided to NAVSUP. This approach would produce an MIS useful to operational level managers, middle level management and top level management at both NAVSUP and NAVMT0. It would do so in a mission oriented, cost effective manner.

Finally, NAVSUP and NAVMT0 would promulgate detailed, firm directives and provide instruction which would clearly delineate what information they desired, who would provide it, when it would be provided and how the information would be presented.

VI. RECOMMENDATIONS

While time and financial constraints necessarily limited the amount of research that this subject deserved, there is no doubt that the NAVMTO Management Indicator Report was a failure as an element of a viable MIS. The report was designed without consideration of the reactions and the problems of those who were to use it. Implementation planning was non-existent and there was no attempt to establish a human/computer interface. Consequently, it is recommended that NAVSUP discontinue the NAVMTO Management Indicator Report requirement. However, it is further recommended that NAVMTO retain its capability to provide the information contained in the report. This will put NAVSUP a phone call away from any information contained in the report if it is needed.

It is recommended an MIS Design Committee be formed immediately to begin planning a NAVSUP/NAVMTO MIS which will serve the needs of all levels of management at both commands.

At the time of this writing, NAVSUP 052 was deeply involved in the development of the Navy Automated Transportation Documentation System (NAVADS), scheduled for implementation in midyear 1979. NAVADS is a NAVSUP sponsored automated management control, planning and documentation system, which will facilitate the

transportation requirements of Navy stock points [22:3]. Swift action by a design committee may enable incorporation of MIS requirements in the NAVADS package.

It is realized that there are other approaches that could be taken to plan, design and implement an MIS at NAVMTO. What is stressed here, however, is that an effective MIS will most likely be realized if it is the result of a well thought out plan which considers organizational objectives, capabilities, shortcomings and the human factors involved.

Lastly, it is recommended that top management participate actively in the design, implementation and operation of any MIS developed for NAVMTO. Without command interest, it will not be an effective tool for management decision making.

APPENDIX A

DESCRIPTION OF THE INDICATORS CONTAINED IN THE NAVMTO MANAGEMENT INDICATOR REPORT

A. System Indicators

1. Percent of Containerized Sealift Cargo--All Services and Navy

Scope. This indicator described the percentage of sealift cargo moving in commercial and military containers within the MSC distribution system.

Measurement. The percent of containerized sealift cargo was the ratio of containerized measurement tons to total measurement tons shipped during the reporting period. Measurement tons shipped included both export and import cargo. Separate measures were required for Eastern Area MTMC and Western Area MTMC controlled cargo by categories of All Services and Navy.

Performance parameters. Parameters applied only to Navy indicators.

Green:	Over 75%
Yellow:	60% to 75%
Red:	Less than 60%

Reporting NAVMTO code. Operations Management Department (10).

Source of data. The Eastern Area and Western Area MTMC's consolidated the required data from MTMC offices and forwarded the information to code 10 by the 10th of each month.

2. Container Cube Utilization--All Services and Navy

Scope. This indicator described the percentage of available container space used for cargo moving in commercial and military containers within the MSC distribution system.

Measurement. Container utilization was the ratio of cubic capacity used to cubic capacity available for containers shipped during the reporting period. Containers with maximum weight utilization were considered

to be at maximum cube regardless of actual cube. Containers shipped included both export and import movements. Separate measures were required for Eastern and Western Area MTMC's for All Services and Navy.

Performance parameters. Parameters applied only to Navy indicators.

Green:	Over 78%
Yellow:	75% to 78%
Red:	Less than 75%

Reporting NAVMTO code. Operations Management Department (10).

Source of data. Eastern and Western Area representatives forwarded a letter report to NAVMTO by the 10th of each month. Since MTMC was the TOA responsible for the coordination of all common user requirements flowing through ocean terminals, this data was available from the representatives at Oakland, California and Bayonne, New Jersey.

3. Transportation Priority Four (TP-4) Utilization--All Services and Navy.

Scope. This indicator described the percentage of allocated TP-4 weight used for movement within the MAC system. (TP-4 material is normally non-air eligible cargo which flies on a MAC flight in a Space Available status at surface transportation tariff rates). Headquarters MAC message, date time group 251445Z March 1978, promulgated new TP-4 policies and procedures which deleted the allocation of TP-4 space to user activities beginning in May of 1978. Consequently, this indicator was considered obsolete and could not be reported as it was defined.

4. MAC ATCMD (Advance Transportation Control and Movement Document) hit rate--All Services and Navy.

Scope. This indicator described the percentage of shipments arriving at MAC Aerial Port of Embarkations (APOE's) after ATCMD input to MAC headquarters.

Measurement. The ATCMD hit rate was calculated using the following formula:

Total ATCMD's received by MAC less shipments without ATCMD plus ATCMD's without shipments. The above is then divided by the total ATCMD's received by MAC.

Separate measurements were required by categories of All Services and Navy.

Performance parameters. Parameters applied only to Navy indicators.

Green:	Over 90%
Yellow:	80% to 90%
Red:	Less than 80%

Reporting NAVMTO code. Operations Management Department (10).

Source of data. MAC forwarded a monthly computer generated report in microfiche format to NAVMTO. The report listed, by military service, the number of ATCMDs received, the number of shipments received, ATCMDs without shipment and the number shipments without ATCMDs.

5. Air Diversion--Challenge Ratio--Ratio and Net Benefit.

Scope. The percentage relationship, in both weight and number of shipments, between the number of air shipments diverted and the number challenged and the net benefit of diversions.

Measurement. The percentage of the total number of challenged air shipments which were diverted during the reporting period in which the challenge is initiated. Net benefit was the value of cost avoidance resulting from diversions. Only NAVMTO challenge actions were considered.

Performance parameters. Applied to the challenge ratio, but not to the net benefit.

Green:	Over 45%
Yellow:	40% to 45%
Red:	Less than 40%

Reporting NAVMTO code. Operations Management Department (10).

Source of data. Shippers sent air clearance requests to NAVMTO by telephone, magnetic card typewriter and Automatic Distribution Network (AUTODIN) terminals (located at Naval Supply Center, Norfolk, Va.). NAVMTO's challenges and subsequent responses were sent by remote Cathode Ray Tube (CRT) terminal to the computer at the Supply Center in Norfolk (NSCNORVA). At the end of each month, NSCNORVA forwarded a report, 4633.27, "Challenge Report Cost Avoidance Summary", to NAVMTO which listed the number of challenges, the subsequent resulting ratio and the number of tons

diverted to surface shipment. From the latter piece of information, the amount of savings, based upon standard surface versus air shipping rates, was computed.

6. Load-Less Load Ratio--All Services and Navy.

During a conversation with NAVSUP Code 052C, it was learned that this reporting requirement was to be cancelled [10].

7. GBL (Government Bill of Lading) Receipt Rate.

Scope. The percentage of GBL memorandum copies which were submitted to NAVMTO within 15 days of shipment.

Measurement. The percentage of GBL memorandum copies received by NAVMTO within 15 days of the shipment date. Computation of the rate was to be based on a comparison of payment and obligation information to allow consideration of late and missing memorandum copies. Only Navy payable documents were to be included. The percentage was to be reported quarterly.

Performance parameters.

Green:	Over 90%
Yellow:	85% to 90%
Red:	Less than 85%

Reporting NAVMTO code. Data Management Department (20).

Source of data. This indicator had been held in abeyance until the implementation of a report program generator by NAVMTO/NSCNORVA. The program was originally scheduled to be implemented in May of 1978 at which time information input from GBL's by NAVMTO via CRT terminals was to be used to generate this indicator. As of this writing, the program was not operational.

8. Type II Household Goods (HHG) Containers.

Scope. The number of Type II Demountable HHG containers available and in use under Navy control.

Measurement. The number of containers available and in use was to be the quantity in the system on the final day of the reporting period.

Performance parameters. None.

Reporting NAVMTO code. Undetermined.

Source of data. NAVMTO was awaiting NAVSUP approval on a NAVMTO proposal to require Navy Personal Property Shipping Offices, worldwide, to provide the number of containers available and in use. NAVSUP indicated this would probably be a semi-annual requirement because of the workload it would impose upon the Shipping Offices [10].

9. Port Hold Times.

Scope. Described the mean shipment hold times experienced at MAC, MSC and QUICKTRANS ports within CONUS.

Measurement. The mean time required for processing shipments through a terminal facility. The measure was computed using the terminal arrival and departure times. Reports were required for the following shipment categories at each CONUS port:

- a. MSC
 - 1. System
 - 2. Navy
- b. MAC
 - 1. TP-1 -- System
 - 2. TP-1 -- Navy
 - 3. TP-2 -- System
 - 4. TP-2 -- Navy
- c. QUICKTRANS
 - 1. Originating terminal
 - a. TP-1
 - b. TP-2
 - 2. Transloading terminal
 - a. TP-1
 - b. TP-2

Performance parameters. None established.

Reporting NAVMTO code. Operations Management Department (10).

Source of data. MAC headquarters sent a letter report providing Navy and system Average Port Processing times in accordance with an August 1977 letter request from NAVMTO [11].

It was noted each MAC letter report stated that,

The times provided above should not be compared, Navy to the port total due to the different routings of Navy cargo, the quantity of validated frequency channels for Navy movement and the difference in the sample sizes.

MSC port hold times were reported directly from a Monthly Activity Report submitted by the Eastern Area MTMC (EAMTMC) and Western Area MTMC (WAMTMC) representatives in accordance with a NAVMTO, code 10 memo, 10:PS 4600 of 22 May 1975, Subject: Reporting activities.

Reference 9 stated that Port Hold Times for QUICKTRANS transit times, reported in item B7 of the Management Indicator Report, was determined to be a more representative indicator of system performance. NAVSUP did not respond to this statement. NAVMTO, consequently, interpreted this to indicate concurrence and did not report QUICKTRANS port hold times. NAVMTO will be directed by NAVSUP to report this indicator using a QUICKTRANS Contractor generated report which is scheduled to begin in October of 1978 [10].

B. NAVMTO Performance Management Indicators

1. Air Clearance Process Time.

Scope. The percentage of air clearances processed within eight hours.

Measurement. Process time was the period from the time of receipt of clearance requests at NAVMTO to the time of successful transmission to MAC headquarters or challenge. The measure was the percentage of all clearance requests processed within eight hours during the reporting period.

Performance parameters.

Green:	Over 95%
Yellow:	90% to 95%
Red:	Less than 90%

Reporting NAVMTO code. Operations Management Department (10).

Source of data. Requests for clearances were received via telephone, magnetic card typewriter or AUTODIN terminal. If the request was received by telephone, it was assumed by NAVMTO that it was processed within eight hours and the request was not counted at all. Requests received by magnetic card typewriter or AUTODIN were logged in, reviewed and entered in batches via CRT terminals to NSCNORVA's data bank. NSCNORVA would then transmit the response to MAC headquarters by AUTODIN. At the time the request was input at the CRT terminal, it was counted as having been processed.

2. Forecasting Values.

Scope. Specified the tonnage and ton-mile values projected for MAC and MSC for each forecasting period (15 and 100 day).

Measurement. Values measured were the forecasted amounts. Units of measure were short tons for MAC and measurement tons for MSC.

Performance parameters. Not applicable.

Reporting NAVMTO code. Data Management Department (20).

Source of data. The Navy Management Fund Administration Department, code 40B, forwarded the forecasted data to code 20 for inclusion in the report. MAC preliminary annual lift requirement forecasts were due at MAC headquarters 21 months prior to the beginning of each fiscal year and an updated forecast was due 100 days prior to the month of operation. Adjustments to the forecasts were allowed to be made up to the 23rd day of the actual month of operation [12:6,7]. Forecasts were reported in short tons, by MAC channel.

MSC preliminary annual forecasts were due 16 months prior to the beginning of each fiscal year and an updated forecast was due 10 months later. In addition, monthly forecasts were due 15 days prior to each month of operation covering that month and the two subsequent months [13:6]. Forecasts were in measurement tons, by MSC Cargo Traffic Areas as opposed to point to point routing.

MAC forecasts were further broken down into the following categories to facilitate rate computation:

1. General Cargo.
2. Mail.
3. Inbound unaccompanied baggage.
4. Total.
5. TP-4 (Short-range only) [12:5].

MSC forecasts were broken out into the following 12 cargo commodities:

1. Chill.
2. Freeze.
3. Coal and coke.
4. Bulk--other.
5. Privately owned automobiles.
6. HHG
7. Ammunitions and explosives.
8. General cargo.
9. Special cargo.
10. Assembled aircraft.
11. Empty conex.
12. Cargo carrying trailers [13:6].

NAVSUP had directed Navy user activities to report their MSC requirements to NAVMTO to assist NAVMTO in making the forecasts [14]. Code 40B, however, made the forecasts based almost exclusively on historical data obtained from the daily and monthly lift reports from MSC (MSC report nr. 6). Other considerations included known fleet exercises and current events (newspaper articles) [1].

3. Forecasting Variance - MAC.

Scope. The percentage variance between forecasted and actual Navy cargo lifted by MAC.

Measurement. The percentage difference between final space assignment forecasted lift and actual lift of the reporting period. Computation was by weight.

Performance parameters.

Green:	Less than 5%
Yellow:	5% to 10%
Red:	Over 10%

Reporting NAVMTO code. Navy Management Fund Administration Department (40).

Source of data. Using the forecasted requirements and the latest monthly message reports from MAC as described in paragraph 2, above, the desired ratio was computed.

4. Forecasting Variance - MSC.

Scope. The percentage variance between forecasted and actual Navy cargo lifted by MSC.

Measurement. The percentage difference between forecasted and actual lift for the reporting period. Computation was reported in measurement tons.

Performance parameters.

Green:	Less than 5%
Yellow:	5% to 10%
Red:	Over 10%

Reporting NAVMTO code. Navy Management Fund Administration Department (40).

Source of data. A ratio was computed using the forecasted lift requirements and actual monthly lift statistics as reported by MSC in their report nr. 6.

5. Forecasting Variance - QUICKTRANS.

Scope. The percentage variance between forecasted and actual cargo which originated in the QUICKTRANS system.

Measurement. The percentage difference between forecasted and actual lift during the reporting period. Computation was reported in short tons.

Performance parameters.

Green:	Less than 5%
Yellow:	5% to 10%
Red:	Over 10%

Reporting NAVMTO code. Operations Management Department (10).

Source of data. Forecasts were made by computing the number of short tons that would be lifted if aircraft availability were 100% of that expected. Actual amounts lifted in short tons were reported by the QUICKTRANS Contractor by the 10th of each month from its home office in Norfolk, Virginia. The report was computer generated and mailed to NAVMTO.

6. QUICKTRANS Airlift Load Factor.

Scope. The percentage of available airlift capability in the QUICKTRANS system actually used.

Measurement. The ratio of airlift ton-miles flown to ton-miles available during the reporting period.

Reporting NAVMTO code. Operations Management Department (10).

Source of data. This data was furnished to NAVMTO by the QUICKTRANS contractor (CFE) by the 10th of each month. Both variables required for the computation were shown on CFE's computer printout. CFE maintained the data utilizing a real time system, constantly updating the data bank located in the CFE home office.

7. QUICKTRANS Transmit Times.

Scope. Described the mean transit time in the QUICKTRANS system by route segment.

Measurement. Transit time was the period from physical receipt of material into the QUICKTRANS system to availability for pick up at the scheduled destination. Separate measures were required for TP-1 and TP-2 shipments.

Performance parameters. Not established.

Reporting NAVMTO code. Operations Management Department (10).

Source of data. CFE operated a real time system with input/output devices located in all of their terminals to maintain constant control and current status of all material moving in the QUICKTRANS system. Consequently, their data bank contained sufficient data to accurately compute the mean time in transit to the nearest minute. This data was forwarded to NAVMTO by the 10th of each month.

8. QUICKTRANS Truck Load Factor.

Scope. The percentage of available lift actually used in the feeder truck system.

Measurement. The ratio of ton-miles moved to ton-miles available during the reporting period. Only dedicated trucks were reported.

Performance parameters.

Green:	Over 70%
Yellow:	60% to 70%
Red:	Less than 60%

Reporting NAVMTO code. Operations Management Department (10).

Source of data. As was the case for indicators B5, B6 and B7, CFE provided this information to NAVMTO on a computer printout by the 10th of each month.

9. NMF (Navy Management Fund) Billings. This indicator was deleted by NAVSUP [10].

10. Unbilled Freight Charges. Reporting requirement deleted by NAVSUP letter of 18 August 1977 [8].

11. GBL Cycle Time.

Scope. Described the time required to process a GBL memorandum copy from receipt to obligation.

Measurement. GBL cycle time was the time-in-production age of documents when obligation occurs. Age was measured from receipt date to obligation date. Indicators were required for mean age and median age measured in whole days.

Performance parameters. Not established.

Reporting NAVMTO code. Data Management Department (20).

Source of data. Means for collecting this data did not exist and consequently, the indicator was not reported by NAVMTO. It was estimated that upon implementation of the Navy Automated Transportation Data System II (NATDS II) in May of 1978, this data could be captured. However, as of this writing, NATDS II was not operational.

12. GBL Backlog.

Scope. Described the quantity and value of incomplete work. Measured units were unprocessed GBL records and the value of freight charges applicable to the backlog.

Measurement. Each document was subject to a single count during a reporting period. The backlog was computed as the number of records on hand but not posted to a final report. Value was based on the freight charges applicable to the backlog.

Performance parameters. Applied only to record counts.

Green:	Less than 8,000
Yellow:	8,000 to 10,000
Red:	Over 10,000

Reporting NAVMTO code. Data Management Department (20).

Source of data. Manually computed from documents on desks within the department.

C. NAVMTO Productivity

1. GBL Processing.

Scope. Described the level of productivity in GBL processing. Counts included work units, man hours, the production rate, straight time hours, and overtime hours. Work units were documents completing the obligation cycle during the reporting period. Man hours counted were those expended for receiving, screening, pricing, encoding, reviewing, and editing GBL's. Man hours for clerical support, research, follow up, report review, report distribution, and direct supervision were also counted when they were specifically related to GBL processing. The production rate was the result of dividing work units by man hours. Separate entries were required for straight time and overtime hours.

Measurement. Work units were counted a single time during the period to complete the obligation cycle. Additional counts for edited or changed information were not valid. Reimbursable man hours and man hours provided by other activities were included. Only man hours directly supporting GBL processing were to be counted.

Performance parameters. Not applicable.

Reporting NAVMTO code. Data Management Department (20).

Source of data. Hours were taken from time cards of employees who were involved in GBL processing. Work units were obtained from logs maintained at CRT input terminals.

2. Air Clearance Processing.

Scope. This set of indicators described the level of productivity in air clearance processing. Counts included work units, man hours, the production rate, straight time hours, and overtime hours. Work units were prime data ATCMD submissions to MAC headquarters during the reporting period. Changes, trailer data,

and cancellations were not countable work units. Man hours counted were those expended for receiving, reviewing, challenging, and routing clearance requests, and submitting ATCMD information to MAC headquarters. Other hours counted were those for tracing, expediting, direct supervision and clerical support. The production rate was the result of dividing work units by man hours. Separate entries were required for straight and overtime hours.

Measurement. Work units were subject to count once during a single reporting period. Man hours counted included work performed by other activities.

Performance parameters. Not applicable.

Reporting NAVMTO code. Operations Management Department (10).

Source of data. As NSCNORVA computer generated report provided the number of work units processed as a result of the air clearance request operations. This data was put into the data bank upon CRT terminal input of each air clearance request. Man hours to be charged were based upon NAVMTO's code 11E's intuitive judgement as to what percentage of the Airlift Division's total time was devoted to air clearance processing.

3. Fleet location inquiries.

Scope. This set of indicators described the level of productivity in processing fleet locator inquiries. Counts included work units, man hours, the production rate, straight time hours, and overtime hours. Work units were locations researched in response to external requests. Man hours counted were those expended for file maintenance, inquiries, responses, direct supervision, and clerical support. The production rate was work units divided by man hours.

Measurement. A work unit was counted each time a location was researched, although the same location may have been researched several times. Man hours were counted only to the extent they directly supported fleet locator processing.

Performance parameters. Not applicable.

Responsible NAVMTO code. Operations Management Department (10).

Source of data. A manual record was maintained to record the number of telephone calls received inquiring as to ships' locations. Hours were intuitively estimated as a percentage of total time spent by the department in answering fleet location inquiries.

4. QUICKTRANS Management.

Scope. Described the level of productivity in QUICKTRANS management. Counts were work units, man hours, the production rate, straight time hours, and overtime hours. Work units were originating tons in the reporting period. Man hours counted were those for contract administration, operation control, supervision, and clerical support. The production rate was work units divided by man hours. Separate counts for straight time and overtime were required.

Measurements. Work units were measured in short tons for cargo originating for air and motor movement during the reporting period. Cargo moving both by air and motor was subject to one count. Man hours counted were those which directly supported QUICKTRANS management.

Performance parameters. Not applicable.

Reporting NAVMTO code. Operations Management Department (10).

Source of data. Work units were taken from the QUICKTRANS Contractor's monthly report. The information was required as part of CFE's contract. As in C2 and C3 above, man hours devoted to QUICKTRANS management were estimated as a percentage of total hours worked in the department.

5. Transportation Management. This indicator was deleted by NAVSUP [10].

APPENDIX B

FUNCTIONS ASSIGNED TO THE NAVY MATERIAL TRANSPORTATION OFFICE PER NAVMTOINST 5450.90B OF 24 NOV 1976

The Navy Material Transportation Office, Norfolk, in the accomplishment of its mission, will:

1. Authorize the movement of Navy material by air, including the arrangement for Special Assigned Airlift Missions; challenge the validity of airlift requirements in accordance with NAVSUP directives; divert material to lower cost modes, as necessary, to control the expenditure of Navy transportation funds and effect reduced transportation and related costs at all Navy shipping activities or other agencies shipping Navy material.
2. Implement policies and develop operating procedures for the Navy contract Cargo Airlift (QUICKTRANS) System and serve as the QUICKTRANS System Manager/Contract Administrator. Provide or arrange for terminal support for QUICKTRANS aircraft and for other aircraft transporting Navy cargo that are not otherwise provided for.
3. Maintain fleet locator information and provide appropriate information to shippers of material destined for Navy ships and mobile units. Arrange for the collection, receipt, inspection, acceptance, monitoring, marking, consolidation, delivery, and documentation of Navy material moving through aerial and water terminals and transshipment points when not otherwise provided for. Provide tracing and expediting service for shipments moving within the Military Airlift Command and QUICKTRANS.
4. Manage Type II Household Goods Containers to include Inventory Control, procurement, rehabilitation and repositioning of containers.
5. Provide technical direction, guidance and assistance in material transportation matters to Navy commands, bureaus, offices, project managers and shipping and transshipping activities, worldwide; conduct training programs as required.
6. Develop and issue instructions and procedures on Navy material transportation matters; review movement plans, instructions and/or procedures originated by

commands, bureaus, offices, inventory control points and purchasing activities when material movement practices and/or costs are significantly affected.

7. Provide management and direction to area mobile transportation coordinators; evaluate the effectiveness of existing traffic management and documentation applicable to the movement of Navy sponsored material; make recommendations for corrective action and take appropriate action when so directed. Analyze and evaluate Navy material distribution and procurement practices to insure transportation economy and consideration of transportation factors.

8. Serve as Navy shipper service office and liaison point for the area or field commands of MTMC, MSC and MAC. Provide direction to assigned liaison officers or personnel serving at those activities. Provide and direct the activities of resident transportation representatives assigned to major commands or offices. Provide interface with other Navy material expediting offices and representatives.

9. Provide program guidance on the technical aspects of shipment planning, transportation, and movement documentation, Navy Transportation Account Code application, and carrier/contractor quality of service analysis and control.

10. Administer the Navy Management Fund, Transportation of Things account including all accounting, billing, and reporting, as directed by the Chief of Naval Operations; and provide Navy Management Fund participating commands, bureaus, and offices with obligation data and budget formulation assistance, as defined by the Comptroller of the Navy.

11. Administer a data collection system to identify appropriate elements of transportation usage and cost. Serve as the central office to accumulate cost information on transportation usage; develop forecasts of Navy requirements for the Transportation Single Managers, for the five year Defense Plan, and unplanned military operations; provide necessary data elements to systems commands, fleet commands and inventory managers to facilitate submission of planning data and budget projections.

12. Develop and maintain a library of tariffs, quotations, schedules, routes and a library of functional publications in the transportation/distribution management field.

13. Maintain a contingent of assigned military personnel in a state of immediate readiness to operate as a Mobile Navy Overseas Air Cargo Terminal team with fleet units in any remote location, as directed.

14. Serve as the NAVSUP field activity for transportation, exercising full authority and responsibility of NAVSUP in the execution of functions assigned. Represent NAVSUP on joint and Navy working panels, committees, boards, review teams, and inspection parties.

15. Execute the Navy Supply Systems Command (NAVSUP) Second Destination Transportation budget plan for Transportation of Things and Terminal Services, which includes a complete audit function to insure validity of charges, accumulation of monthly expenditures, and statistical analyses. Submit reports to NAVSUP.

16. Perform such other duties as may be assigned by Commander, Naval Supply Systems Command.

APPENDIX C

NAVMTO MANAGEMENT INFORMATION SYSTEM DESIGN SURVEY

General Instructions

As a NAVMTO Department Head, you are thoroughly familiar with that aspect of the Navy's Transportation System for which you are responsible. This questionnaire has been developed to utilize your experience and knowledge in the transportation field in designing a NAVMTO Management Information System. It is important that you answer the questions with your own opinions and beliefs. Your answers should not be restricted to the current information system; in fact you are encouraged to express your opinion about how a new information system should be structured.

Five response lines have been provided for each question, but you may use as many or as few lines as you feel are necessary to answer each question. Should you require additional space, you may use the reverse side of the questionnaire.

Name: _____ No. of years in department: _____

Department: _____

Section I: Missions and objectives

1. What do you consider to be NAVMTO's missions or objectives?

A.

B.

C.

D.

E.

2. What do you consider to be your department's objectives?

A.

B.

- C.
- D.
- E.

Section II: Department Functions

The following questions relate directly to your answers to question number 2 in Section I. Again, since your answers are to be the foundation for the design of a new MIS to serve all levels of management, it is important that the answers be yours and not a reflection of information contained in any instruction or directive.

3. What functions does your department perform in meeting objective A in question 2? Also, please circle the rating you would give each function as to its importance in meeting the objective.

A sample answer might look like this:

- A. Provide field training in packing and crating techniques.

1	2	3
critical	important	desireable

Please indicate your answers below:

A.

1	2	3
critical	important	desireable

B.

1	2	3
critical	important	desireable

C.

1	2	3
critical	important	desireable

D.

¹	²	³
critical	important	desireable

E.

¹	²	³
critical	important	desireable

4. What functions does your department perform in meeting objective B in question 2?

A.

¹	²	³
critical	important	desireable

B.

¹	²	³
critical	important	desireable

C.

¹	²	³
critical	important	desireable

D.

¹	²	³
critical	important	desireable

E.

¹	²	³
critical	important	desireable

5. What functions does your department perform in meeting objective C in question 2?

A.

¹	²	³
critical	important	desireable

B.

¹	²	³
critical	important	desireable

C.

¹	²	³
critical	important	desireable

D.

¹	²	³
critical	important	desireable

E.

¹	²	³
critical	important	desireable

6. What functions does your department perform in meeting objective D in question 2?

A.

¹	²	³
critical	important	desireable

B.

¹	²	³
critical	important	desireable

C.

¹	²	³
critical	important	desireable

D.

¹	²	³
critical	important	desireable

E.

¹	²	³
critical	important	desireable

7. What functions does your department perform in meeting objective E in question 2?

A.

¹	²	³
critical	important	desireable

B.

¹	²	³
critical	important	desireable

C.

¹	²	³
critical	important	desireable

D.

1	2	3
critical	important	desireable

E.

1	2	3
critical	important	desireable

Section III: Performance Indicators

This final set of questions attempts to determine how you would measure the effectiveness of your department's efforts in meeting the objectives listed in question 2.

8. What measures might be used to assess your department's effectiveness in meeting objective A of question 2? (A sample answer might be "Number of bases visited per month" or "Cost reduction in packing per base visited.") Please list your answers below:

A.

B.

C.

D.

E.

9. What measures might be used to assess your department's effectiveness in meeting objective B of question 2?

A.

B.

C.

D.

E.

10. What measures might be used to assess your department's effectiveness in meeting objective C of question 2?

- A.
- B.
- C.
- D.
- E.

11. What measures might be used to assess your department's effectiveness in meeting objective D of question 2?

- A.
- B.
- C.
- D.
- E.

12. What measures might be used to assess your department's effectiveness in meeting objective E of question 2?

- A.
- B.
- C.
- D.
- E.

Section IV: Your requirements, comments and suggestions

Please list below any data or information not included in the previous sections which you would like to receive, and feel is necessary, in order for you to effectively manage your department. Also, use this section to make comments or share ideas on what an MIS should do for you and NAVMTO.

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